A STUDY OF RUBBER SMALLHOLDINGS IN THE KUCHING DISTRICT, SARAWAK.

by

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CHAPTER I

INTRODUCTION

Development of the Rubber Industry

The growing of rubber trees in Sarawak started in 1881 when Bishop Hose obtained 3 of the first rubber seeds which reached Singapore in 1876 and planted them in the mission compound of Kuching. But it was not until 1905 that the rubber boom started, a direct result of the huge demand created by the development of motor cars and bicycles with rubber tyres. Farmers planted rubber trees in their land as fast as they could. Most of the planting was in small holdings. In 1910, Sarawak shipped her first consignment of 160 piculs. This increased to 1453 piculs in 1912 (Rawlins, 1965, p. 211). Thereafter, rubber rapidly became one of the main exports of Sarawak and still remains so today. In 1966, in terms of value, exports of rubber ranked second only to timber in the list of Sarawak exports (Sarawak Gazette, 1967, p. 286).

Today, natural rubber faces competition from synthetic rubber. An alternative cash crop could not be found (Sarawak Annual Report, 1962, p. 88), therefore the government is forced to undertake some positive measures to improve the production of rubber.

Prior to 1956, there is little technical advance in the modern method of cultivation, in the use of high-yielding clones and in the manufacture of high grade sheet (Department of Agriculture, Kuching, 1966, p. 3). In 1956, the government established a scheme to help rehabilitate the rubber industry by subsidizing farmers in

their new planting work. By 1968, 142,700 acres were successfully planted (Department of Agriculture, Kuching, 1969).

This is the future trend of the rubber industry in Sarawak as exemplified by the fact that already in the First Division of Sarawak, high yielding rubber makes up 55.3% of the total rubber acreage (Department of Agriculture, Kuching, 1970, p. 1). The intention of this paper is to study some of the rubber smallholdings which participate in the scheme.

CHAPTER II

LOCATION AND EXTENT OF THE KUCHING DISTRICT

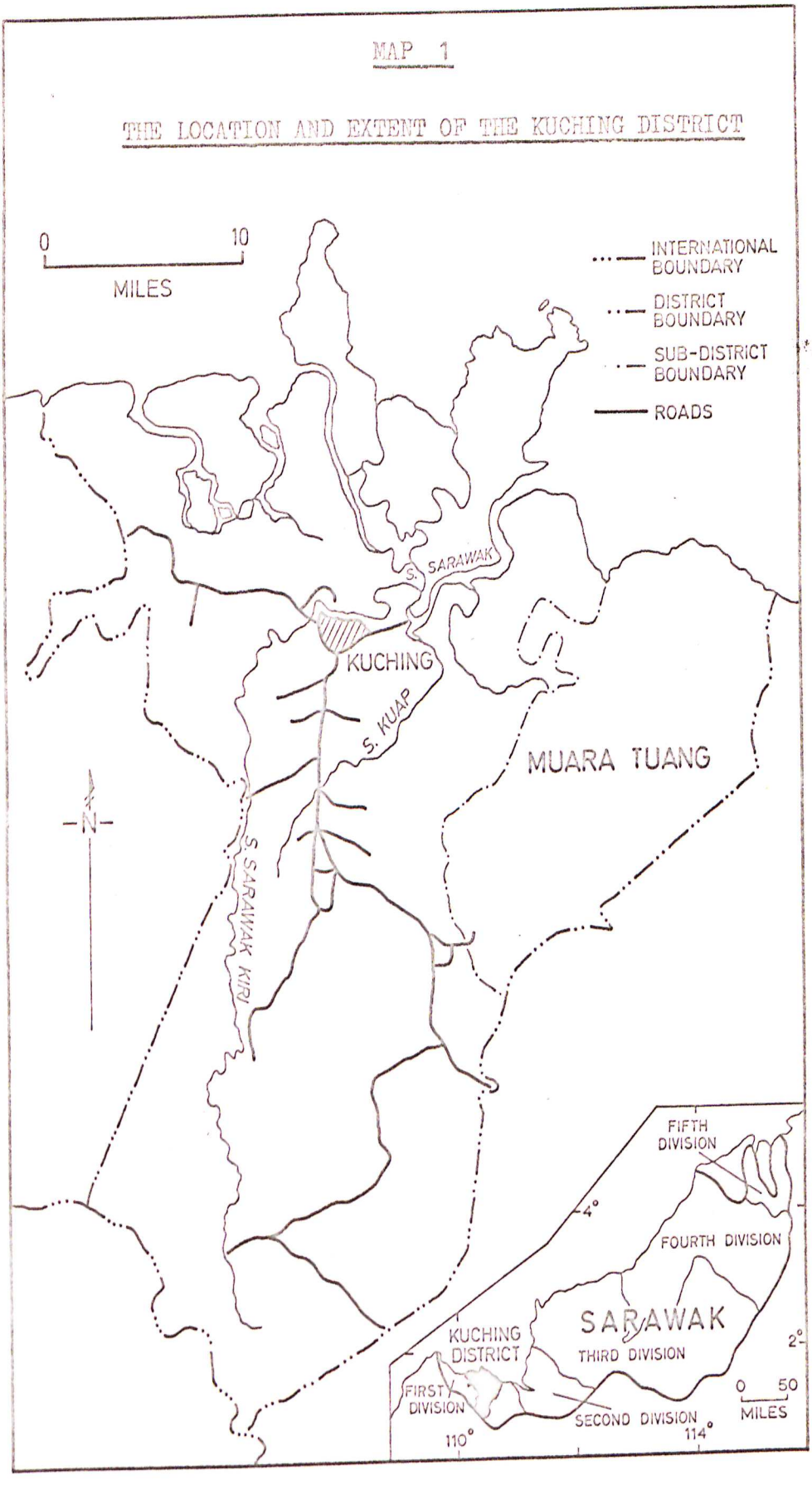
The Kuching district is located in the First Division which is at the western part of Sarawak (Map 1).

The district lies between longitudes 110° 8' East and 110° 39' East; and latitudes 1° 3' North and 1° 48' North. It is wider at the Northern part but narrows gradually towards the South (Map 2).

The kampongs under the survey lie within the 20 mile radius southwards from Kuching town (Map 2).

MAP 1

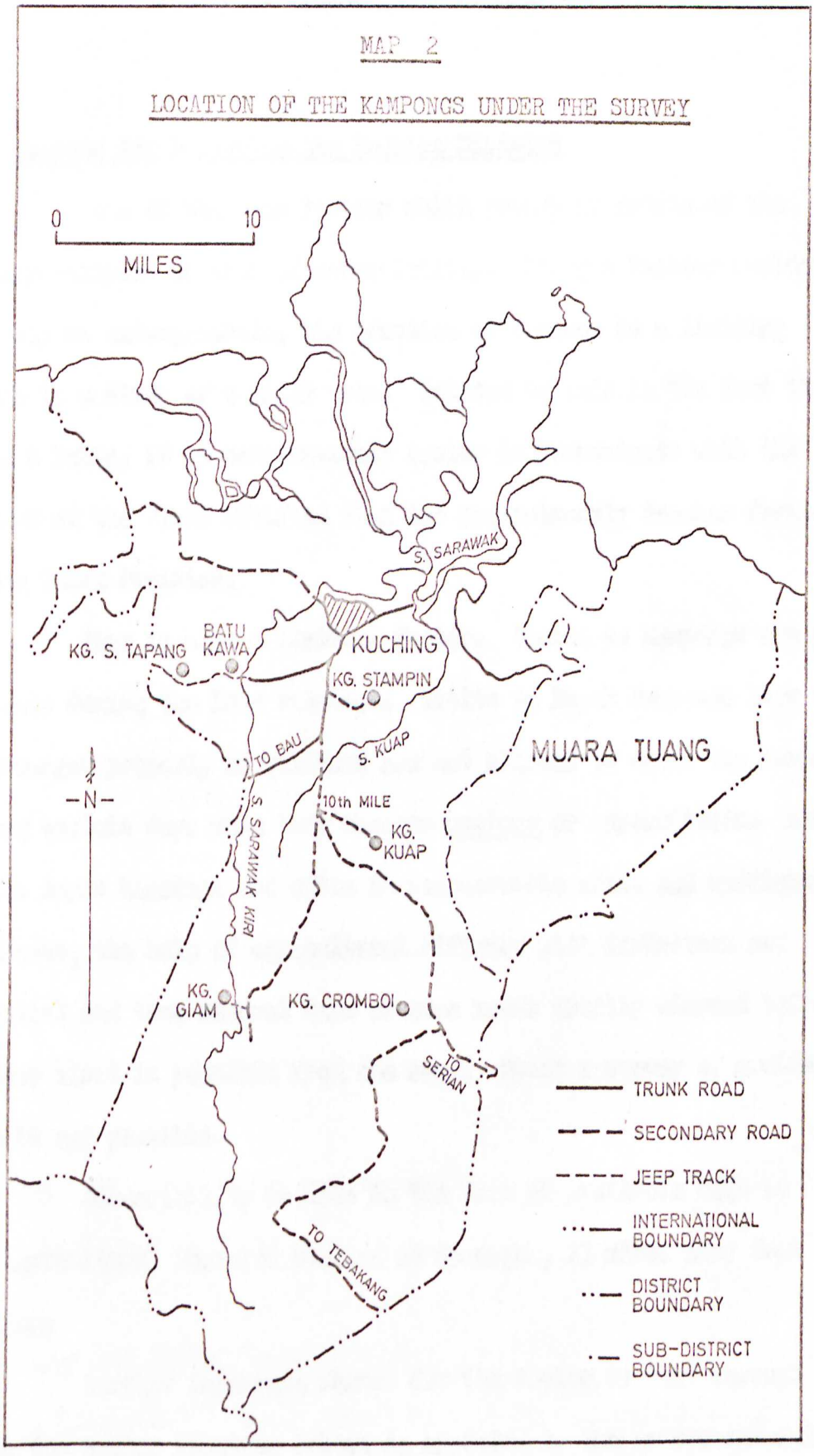
THE LOCATION AND EXTENT OF THE KUCHING DISTRICT



Source: Map of Sarawak, 1: 500,000; 1969, 2nd Ed.

MAP 2

LOCATION OF THE KAMPONGS UNDER THE SURVEY



CHAPTER III

CHOICE OF THE AREA

(i) Reasons for Selecting the Kuching District

One of the main factors which govern my choice of the Kuching district is that of accessibility. Being a Kuching resident and only an undergraduate, the question of finance is a limiting factor to a study of a wider area. Related to this is the fact that being a Hakka, it is comparatively easier to communicate with the farmers of the First Division than the predominantly Foochow farmers of the Third Division.

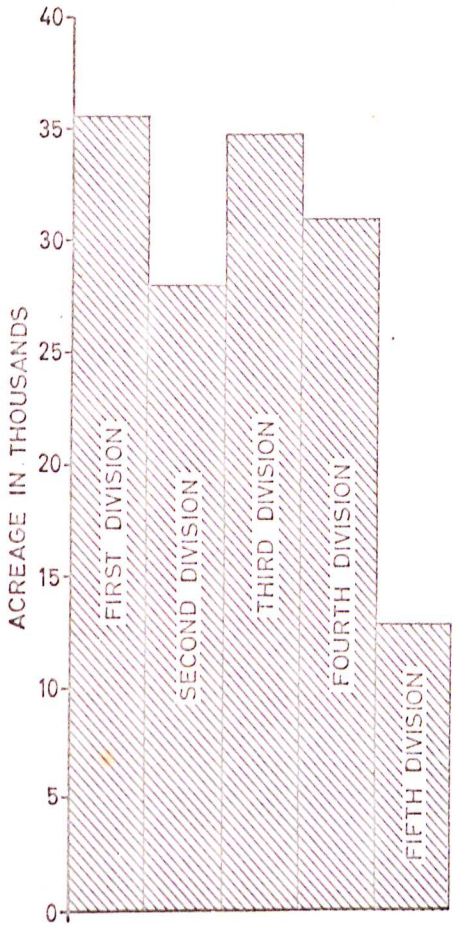
Time is also a limiting factor. Visits to kampongs are possible only during the long vacation. Visits to Dayak kampongs have to be arranged properly as visitors are not allowed to enter the kampongs during certain days when they observe pantang or superstition. Also, as the Dayak kampongs are often in inaccessible areas and difficult to locate, the help of agricultural officers with landrovers are essential and thus several days or even weeks usually elapsed before another visit is possible from the next. Hence a survey of a wider area is not possible.

Accessibility is also in the form of available data at the Agricultural Research Station at Semongok, 13 miles away from Kuching.

Another important reason for the choice is that acreage under the Rubber Planting Scheme A, approved by the government and the initial response by the people is greatest in the First Division (Fig. 1)

of which the Kuching District is the most important. This is important

FIG. 1 : RUBBER ACREAGE UNDER R.P.S.A. (1956 - 1968)



because the lots and holdings under the survey are those planted in the 1956/57 periods and are under production now.

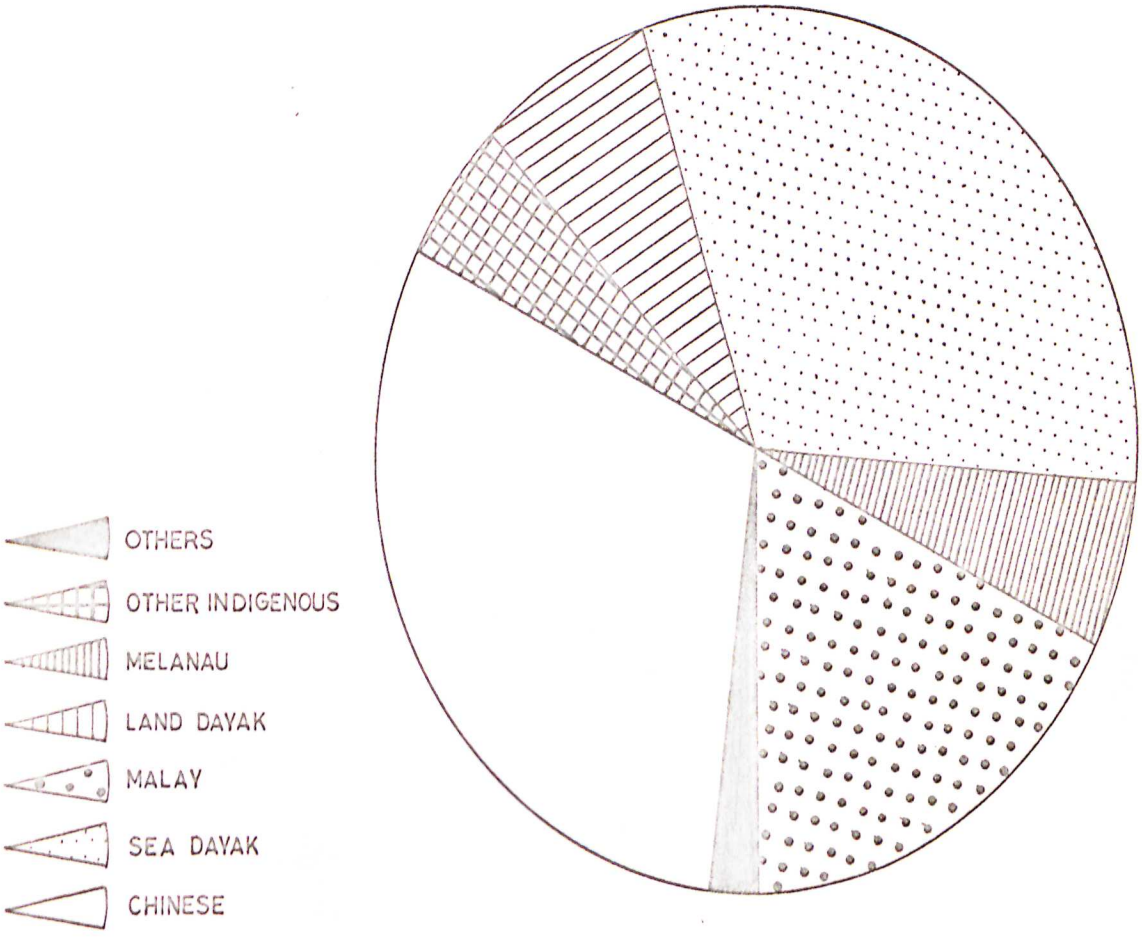
(ii) Limitations of the District Chosen

The district chosen cannot be said to be representative of

all other districts in Sarawak. Although government aid and instructions are similar in all areas, the response from each lot or holding is the result of the interaction of socio-economic-cultural factors. No 2 persons think and react alike. This is even more so between peoples of different cultures and traditions and who possess different socio-economic standards.

Sarawak is a multi-racial state (Fig. 2). This is further complicated by the fact that some groups predominate in some divisions

FIG. 2 : COMPOSITION OF SARAWAK'S POPULATION



but are absent in others. Thus for example, 98.8% of the Land Dayaks are found in the First Division while the Sea Dayaks, the Malay and Muruts predominate in the Third, First and Fifth Divisions respectively.

Hence a study of a division, let alone a district, would not be representative of all holdings.

But on the other hand, it must be pointed out that though the indigenous peoples of Sarawak may differ in history and character, their general primitive standard of living, their low-level cultures and their simple attitude towards life are common to all. Malcolm MacDonald, former Commissioner-General for the United Kingdom in South-East Asia, pointed out that in Sarawak, people still have the wisdom to live comparatively simple lives. Uncorrupted by vast, soaring, stupid, unattainable ambitions, most of them are content so long as they have enough food to eat, a roof over their heads to protect them from the tropical wind, rain and sun, interesting work to do and the affection of their families and friends to make life sweet (Heyward, 1963, p. 22).

In connection with the above is that the sample is very small consisting of only 7 Chinese and 12 Dayak gardens. Of these, all the Chinese gardens are lots and not holdings. Therefore the yield per acre is different because other lots are under ordinary trees. The organisation of the production of rubber is different too because the other discrete lots may not be operated by the owner but by hired labor or tenants. Thus the Chinese lots may not be representative, of the holdings. In the case of the Dayaks however, 11 out of the 12 gardens are holdings.

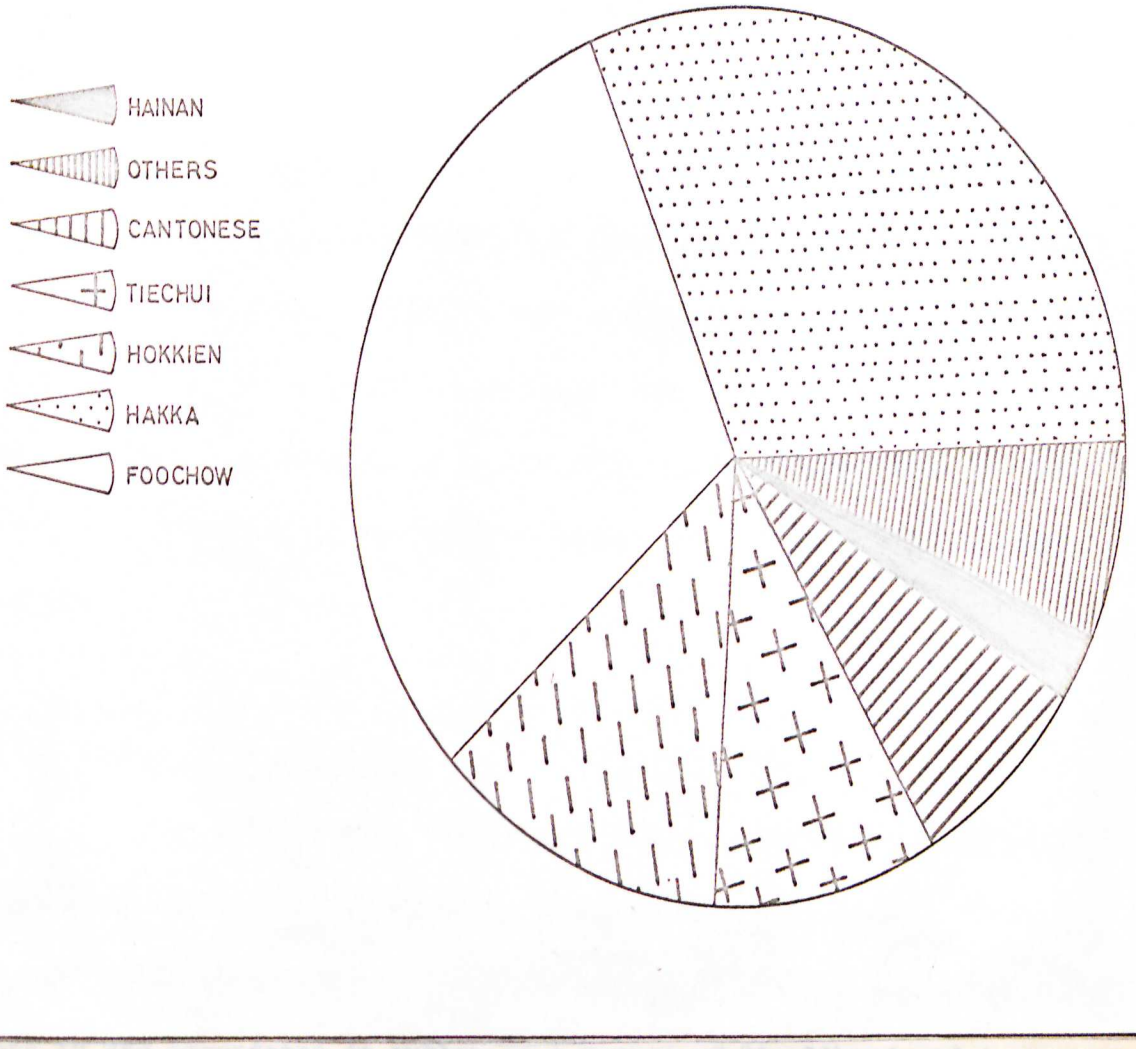
But in this study, only a small sample can be taken because of the various limitations such as cost and time as discussed earlier on.

The method of how these samples are chosen is also not recommendable. The time and the cost factors pose as great obstacles thus no attempt is made of a random sample which would be more representative. All the farmers chosen are those known to be co-operative and within easy reach. Holdings nearer to the Indonesian border cannot be sampled because of the curfew imposed by the government in her efforts to stamp out communist activities.

Another limitation is that this survey does not include Malay holdings. This is because the response from the Malay community is very poor in the 1956/57 period, a result of the general attitude of distrust in the new clones and seedlings distributed by the government. The Chinese and Dayaks are not immuned from this either, but being farmers they are willing to give it a try whereas the Malays are mostly fishermen and hence are less willing to try on a new venture. Now however, all communities are vying with each other for the government subsidies.

Not all the Chinese lots are the same either. The farmers in the First Division and under the survey are Hakkas but in the Third Division the Foochows predominate. Hence the question of Chinese dialect groups (Fig. 3), further complicate matters, because different dialect groups come from different parts of China and follow their own customs. The Foochows come from the area around Foochow, the capital of Fukien while the Hakka in Kuching come mostly from the provinces of Kiangsi and Anwei (Tien Ju Kang, 1956, p. 15). But generally however, their response is not much different. Hardwork and a long experience of the money economy leads to the same goal.

FIG. 3 : COMPOSITION OF THE CHINESE COMMUNITY



(iii) Conclusion

Thus though it cannot be said that the area under study, that is the Kuching district, is representative of all other districts in Sarawak, nonetheless, it is not much different because in all the districts there are Chinese and indigenous smallholders.

CHAPTER IV

STRUCTURE OF PRODUCTION

(i) Types of Holdings

In Sarawak, there are 3 types of holdings namely smallholding of 25 acres or less; medium size holding of between 25 to 100 acres and estate which is more than 100 acres (Department of Agriculture, Kuching, 1966, p. 2). Of these, smallholdings is the most predominant. In fact, nine-tenths of rubber lies under smallholding (Jackson, 1968, p. 89). This predominance of smallholdings is a legacy of the Brooke policy which discouraged any large-scale capitalist development, fearing that any such development would dislocate the lives of the indigenous peoples.

(ii) Types of Smallholders

The smallholding sector consists of a number of smallholder families, each owning 25 acres or less. Within this sector, there occur marked variations in the distribution of smallholder activities and in the dependence on rubber as a source of livelihood and income. Activities in order of importance for a chinese smallholder are rubber production, vine growing, vegetable and fruit growing. For the Dayak smallholder, top priority goes to padi cultivation, then rubber production, fruit growing as well as collecting jungle fruits and vegetables. The degree of dependence on rubber will be dealt with later.

Thus in an attempt to classify smallholders, the most valid criteron is the ethnic variable of which the 2 main groups in the

First Division of Sarawak consists of Chinese and Land Dayaks.

(iii) Size of Holdings

An average Chinese garden under the survey is 6 acres and that for the Dayaks average 2 acres. These acreages, particularly for the Chinese farmers, do not represent the total acreage under rubber. It is a lot rather than a holding. The terms "lot" and "holdings" cannot be used interchangeably, the fundamental difference being that the former is a surveyed piece of land with a lot number while the later is a unit of ownership. In the survey, all the 7 Chinese rubber gardens are lots but 11 out of the 12 Dayak gardens are holdings.

(iv) Organization of Production

Two broad system of operation in the production of rubber are undertaken in the Chinese lots namely owner operation and hired labor. On the Dayak holdings, only owner operation prevails.

Owner tapping is the most common amongst the Chinese smallholders. Owner or family tappers are own account workers engaged in producing rubber only from their own gardens. In the lots under the survey, outside labor is employed only where the lot is too large for the family labor to cope with and/or in lots where the owner does not perform any form of agricultural activity.

The absence of hired labor among the Dayak smallholders can be explained by the absence of the 2 above factors - their rubber acreage being too small to be economically exploited by hired labor and also all of them are involved in some form of agricultural pursuits.

Hired labor is not paid by the hours of work but on a share basis of the produce. Under this bagi dua basis, the income obtained from the selling of rubber sheets is equally divided after the reductions of expenses incurred for processing and general maintenance of the garden. This must be distinguished from tenancy because the hired labourers have no claim either on the land or trees for a period of time.

An attempt is made by the writer to see whether the kongsi system of the Chinese and the labor exchange system of the Dayaks exist in this sector.

The kongsi system developed out of the experience of Chinese immigrants, coming in compact clan and village groups to a strange land in which they have to fend in all matters completely for themselves (Ward, 1954, p. 3; Gullick, 1967, p. 9). The original kongsi organization is an almost ideal form of common weal. The members work together in all matters sharing the produce equally amongst themselves (Ward, 1954, p. 15). But this organization is now a thing of the past. The kapitan or district head who formerly acted as the head of the whole kongsi, does not weal as much influence or power as in the past. Now he is only empowered by the government to deal with minor disputes, the signing of birth and death certificates. The institutions of Kapthai, head of the structure of authority, and Lo Thai, village head, do not exist any more. This absence of the kongsi system clearly reflects the weakening of the clan influence. This weakness is in part economic and in part education. There is now less indebtedness and less dependence than formerly (Outram, 1959, p. 126). The rate of literacy has undoubtedly increased. The effect of education in the abolition of clan

separatism can hardly be over-emphasized, even the poorest farmer or rubber tapper would deny himself all but the bare necessities of life in order to contribute towards his children's education (Outram, 1959, p. 127). This gave vent to a common language among the educated Chinese and to a lesser identification among themselves as belonging to different dialect groups.

The labor exchange system which exists in the Dayak community whereby there is an exchange of labor between households to enable the main work of planting, weeding and harvesting to be done effectively, applies only to padi and not to cash crops like rubber. This is mainly because rubber is a perennial crop and its economic life will be considerably shortened by unskilled tapping.

(v) Dependence on Rubber

Chinese smallholders place a great dependence on their rubber as their source of income. In the Chinese gardens surveyed, most of the smallholder's land is under rubber. Each family has only 300 to 400 vines to keep them occupied in the afternoons and for their own consumption.

According to the Chinese farmers, it is not possible to grow more vines. A close integration between the planting of vines and rubber trees would be difficult as vine growing is not only capital intensive but also labor intensive. Vines need a lot of constant attention and the available labor in an average smallholder family is unlikely to meet the heavy labor demand needed by both these crops.

The Dayak farmers however place more emphasis on the cultivation of padi than on any other crops. Padi has been their traditional

and staple crop and living in interior uplands, they are contented to carry on with their subsistence mode of living. Rubber tapping is an occasional pursuit to be followed only during the off season for padi (Geddes, 1954 b, p. 95). The growing of cash crops among the Land Dayaks is a new phenomenon and is the direct result of the filtering down of the money economy to their community through the contact with and the influence of the Chinese. All along the Kuching - Serian road they (Land Dayaks) are in daily contact with the Chinese and Malay and other modernising influences (Lee, 1962, p. 46). This has several bad effects but is not within the scope of this study to be discussed. Now, it is not uncommon to find Dayaks near the urban areas to grow more than 2 cash crops. A farmer of Kampong Cromboi for example, has apart from his 2 acres of rubber, 1½ acres of coconut, an acre of vegetable and a couple of hundred vines. He freely admits that it is through his contact with the neighbouring Chinese farmers that he has cultivated the last 3 crops by observing and asking the advice of Chinese farmers. His rubber holding is under subsidy from the government.

There is an exceptional case out of the 12 under the survey, at Kampong Giam where one Dayak family completely deviates from the norm by depending mainly on rubber as a source of livelihood and income. The owner-cultivator, Tom[1], does not plant padi at all, maintaining that he and his family are financially better off with a rubber economy than a subsistence level rice economy. This is economically true as the following calculation shows.

Tom taps an average of 2 sheets per day.

So does his daughter.

---

1 Fictitious name

Each unsmoked sheets weighs an average of 2 katis, thereby bringing the total to 8 katis per day. Price of unsmoked sheet in January, 1970 stabilises at around $56/= per picul (Department of Agriculture, Kuching, 1970). Hence the total daily income for the family amounts to 56 cents per kati

x 8

$4.48 cents

Price of one gantang of local rice is $1.80 cents. This income from rubber would bring in a little less than 2½ gantangs of rice daily which is more than enough for his family of 5.

But few Dayaks dare to break away from their adat or tradition. For generations, Dayaks have been hill padi cultivators on a subsistence level supplementing their meagre diet with jungle fruits and vegetables, wild animals and birds from the forest and fish from the rivers. So says a typical Dayak, "Our adat is bound up with our work, Our worship goes with our work ..., we don't work unless it has something to do with our worship ... if we lose the adat, we are afraid we would lose the discipline that goes with it ... we are tied to the old adat" (Howes, 1960, p. 493).

Thus unlike their Chinese counterparts, most Dayak farmers do not give first priority to rubber and their work in their rubber holdings is conditioned by their activities in their padi fields. The Chinese farmer gives first preference to his rubber, being economically dependent on it and only in the afternoons when he is relatively free

from the chores of his rubber garden does he attend to his 300 to 400 vines.

CHAPTER V

PLANTING

(i) Location of Holdings/Lots

A study of the location of the holdings and lots is made and it has been found that the Chinese house is within the rubber garden but this is not so for the Dayaks. Dayak rubber holdings are about 1 or 2 miles away except for a few like that of Tom of Kampong Giam who has moved out from the main kampong to live near his rubber holding. Three out of 5 smallholders in Kampong Giam under the survey have to travel by small sampans across the Batang Sarawak Kiri (Plate I) to go to their rubber gardens which are on the other side of the river. Plate I shows a Dayak on his way back to the kampong after work in his rubber holding. This is the direct result of the different type of land tenure system which is prevalent in these 2 communities.

The Chinese has legal land title deeds for their holdings. Under the Chinese family law, there is no female inheritance. The general custom is to consider the property of the father as vested in all his sons in equal shares (Anonymous, 1927, p. 9). Thus each son will build his own house for his family in the share given in the midst of his rubber acreage.

The Land Dayaks however, do not have legal land title deeds. The prevailing concept is that of general overall possession of land as belonging to the village as a whole (Geddes, 1954 b, p. 20). But this idea of "common soil" (Ibid.,) does not apply to all the land in

PLATE I : THE BATANG SARAWAK KIRI

Taken - 26. 3. 70.

the village except in cases where all the members of the village are related which is not common. Thus, this is not a communal system of land tenure in the real sense, like those practised in Africa where tribal land is allocated by the chiefs after a certain period of time. The prevailing system of land tenure of the Land Dayaks is more appropriately termed TURUN system, as will be elaborated.

In the Dayak community, rights of the land are first obtained by the person who clears it of primary forest and these rights are later passed on to all his descendants or TURUN, male and female on a rotation basis, the length of which depends to a large extent on the TURUN : LAND ratio. A distinctive feature of the Land Dayak system is that the rights of the land never lapse. For most societies which base their land tenure system on a genealogical basis, a particular line of descent would have strengthened its claim on the land by constant use based on the principle of usufructuary rights. According to their system, a man's claim become stronger the less use his forefathers had made of the land. The principle behind this is that the line which has made the least use of the land has benefitted the least from it and should therefore have the next turn.

This system of Land Tenure of the Land Dayaks is not suited for perennial crops like rubber which will start to produce only after 6 to 7 years and whose economic life span stretches to 30 years. Perennial crops can thus only be planted some distance away from the main village whereby it would either be impossible or inconvenient for all the Turun to make use of all the areas of land over which they have rights. But more often than not, these lands are appropriated for a long term occupation by certain members of the descent group. Because of the availability of land, the other members of the line do not object

even though it means that these areas will be out of circulation among them at least for a generation. Areas appropriated would be some distance away as land near the village would be in great demand. This may probably lead to the development of individual land tenure.

A couple of Dayak holdings in the survey are recently cleared areas and therefore can be cultivated for as long as the first cultivators are capable. Land near the village have already been taken up for padi, therefore these farmers have to go further away in search of uncleared land.

Another factor which would also account for the distance of Land Dayak Rubber holdings from the place of permanent residence is that of culture. The Dayaks give first preference to the cultivation of padi, their staple food being rice. Therefore they prefer to stay closer to their padi farms than their rubber holdings. Moreover, rubber trees do not require very much attention once they are big. Dayaks slash the undergrowth usually once a year whereas padi require most of their attention throughout the year for example, weeding, fencing, birdscaring, and harvesting.

As a contrast to this, the Chinese rubber smallholder depend mostly if not wholely on his rubber for his livelihood. Thus he would be more anxious to keep a close watch over his holdings.

(ii) Density

All the rubber smallholdings under the Rubber Planting Scheme A have to abide by the rules of planting 180 trees to the acre, 9 feet distance between trees and 30 feet distance inter-row.

(iii) Composition of Trees

An examination of 5 Land Dayak holdings and 4 Chinese holdings in Sungei Tapang under the Rubber Planting Scheme A show the following composition of trees in the holdings or lots (Figs. 4 a; 4 b). The Chinese have a greater percentage of trees of untappable size over the Dayak holdings. This suggest that the Dayaks tap their trees earlier than the Chinese as they have small acreages thereby accounting for the

FIG. 4 a : COMPOSITION OF RUBBER TREES FOR CHINESE LOTS

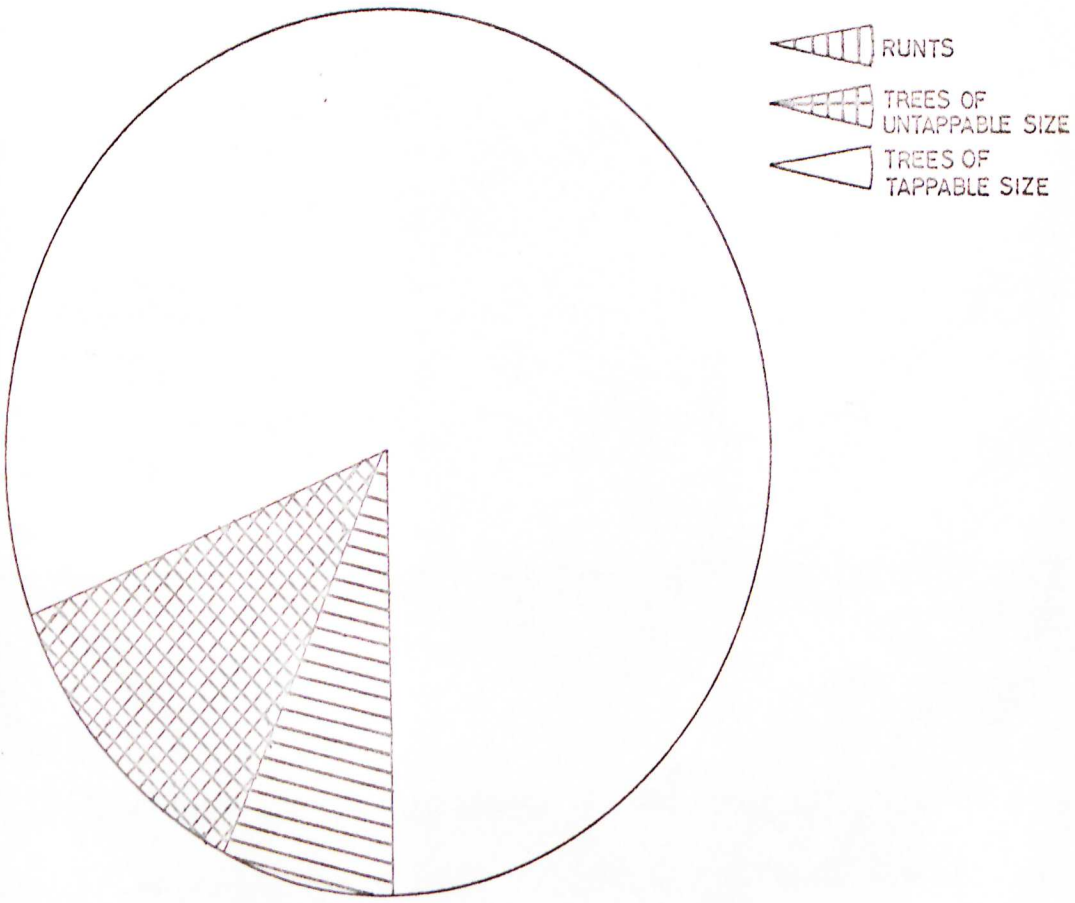
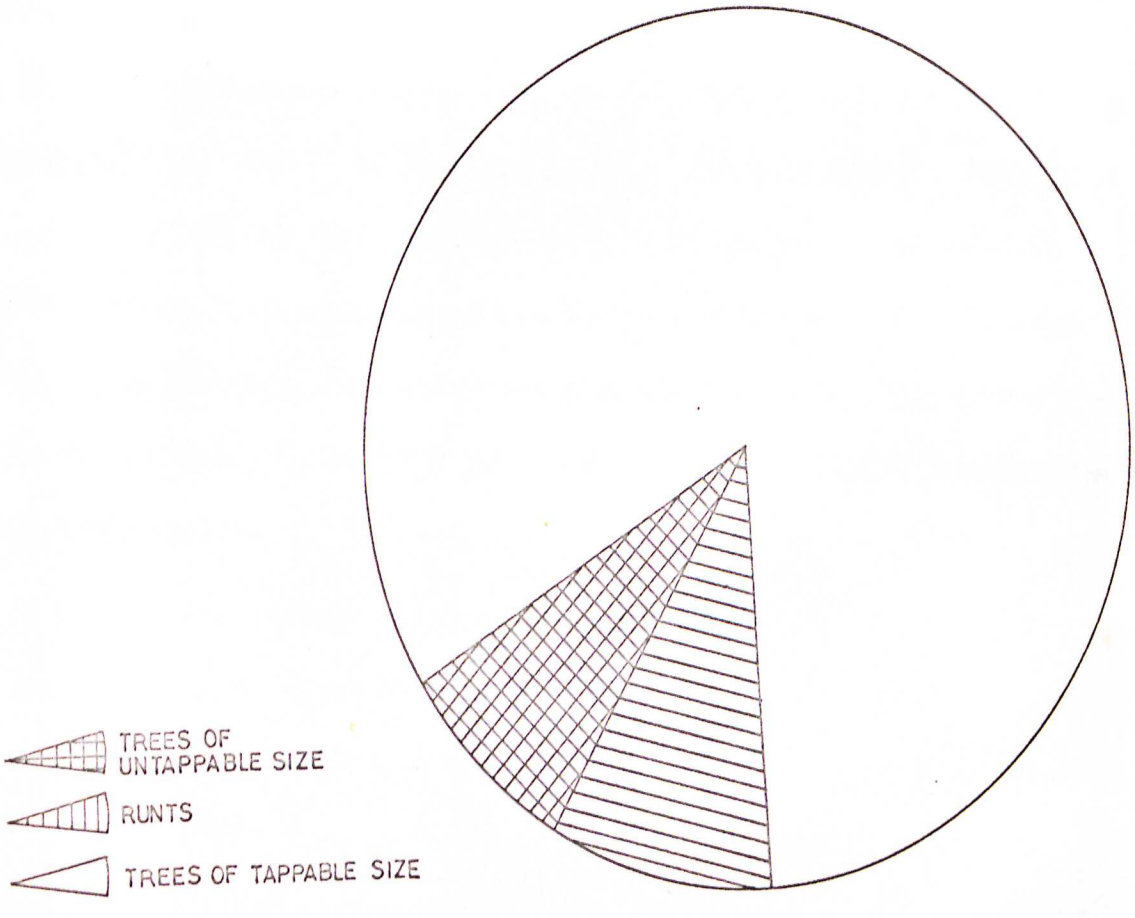


FIG. 4 b : COMPOSITION OF RUBBER TREES FOR DAYAK SMALLHOLDINGS



greater percentage of tappable trees. On the other hand, Chinese lots have a lesser percentage of runts compared to the Dayak holdings indicating that trees in the Chinese lots are more healthy and better looked-after.

(iv) Aid from the Government

Aid given by the government to the smallholdings are similar, regardless of who the owner is. Subsidy is payable at a rate of $200/= per acre for new planting and $450/= per acre for replanting in 1956. But in 1959, to offset the additional cost and permit, the subsidy for new planting is increased from $200/= to $250/= per acre. This subsidy is financed by a cess of 2 cents per pound imposed on all exported rubber (Sarawak Annual Report, 1962, p. 89; Sarawak Information Service, (undated), Information on Sarawak, p. 33). All land charges other than quit rent is payable from the Rubber Planting Scheme funds. A study of the Rubber Planting Scheme A record cards show that both Dayak and Chinese smallholders received government subsidy in the form of seedlings, RRIM fertilizers, weedkillers like Dowpon, lallang oil and insecticides like agrocide.

CHAPTER VI

TAPPING

(i) Equipment

Rubber tappers use a special tapping knife for tapping trees. These knives are usually sharpen before the tappers go to tap the trees.

(ii) Skill

From the Survey, it is seen that a Chinese tapper taps around 300 trees per day compared to an average Dayak tapper who taps only 200 trees per day. A Chinese tapper on an average produces 4 sheets per day compared to 2 sheets per day for the Dayak. This perhaps can be accounted for by the fact that Chinese has a longer experience in the tapping of trees being trained by their skilful forefathers when young. The Dayaks are new to this skill but with practice and training can be expected to tap more trees.

It is also important to note that the Chinese tap longer per day than the Dayaks. Dayaks waste 15 to 20 minutes daily, travelling from their house to their gardens which are about 2 miles away, and not at the backyards like those of the Chinese.

Another factor is that many tappers, particularly the Chinese bring their children to scrap cuts and sprouts and cleaning cups, thus enabling the tapper to tap more trees as the jobs other than actual tapping are done by child helpers.

(iii) Method and Frequency

Both Chinese and Dayak tappers use either a half or one-third spiral cut (Plate II), tapping from the top left corner to the lower right.

PLATE II: A ONE-THIRD SPIRAL CUT

Taken 25. 2. 70.

Trees are tapped on a daily basis, that is, on every tapping day. A technical point to note is that daily tapping causes damage to trees especially those tapped by the half spiral cut method which makes them more prone to the brown bast disease. But Chinese farmers maintain that this has not been the case. The answer probably lies in the nature of the trees. Being healthy and still young, trees are capable of producing and replacing the tissue cells that have been damaged by over-tapping.

(iv) Pattern of Tapping

The graphs (Figs. 5 a, 6 a) show that there is a marked monthly variation in the tapping of both the Chinese lots and Dayak holdings. The annual range is greater for Dayaks than for Chinese and this is especially so in 1968. The pattern of tapping appears to be closely governed by both the amount of rainfall and the number of rain free days in the month (Figs 5 b, 6 b). The former alone does not determine the pattern of tapping since the figures given by meteorological station are monthly figures. Intense afternoon thunderstorm will have little or no effect as tapping is done in the early mornings. The small number of tapping days during the landas months are apparent. These landas months are usually from early October to February, when the North East Monsoons prevail, and they represent the main rainfall peak for Sarawak.

The tapping pattern of the Dayak is further governed by the activities of padi cultivation (Fig. 7).

FIG. 5 a : SEASONAL PATTERN OF TAPPING (1967)

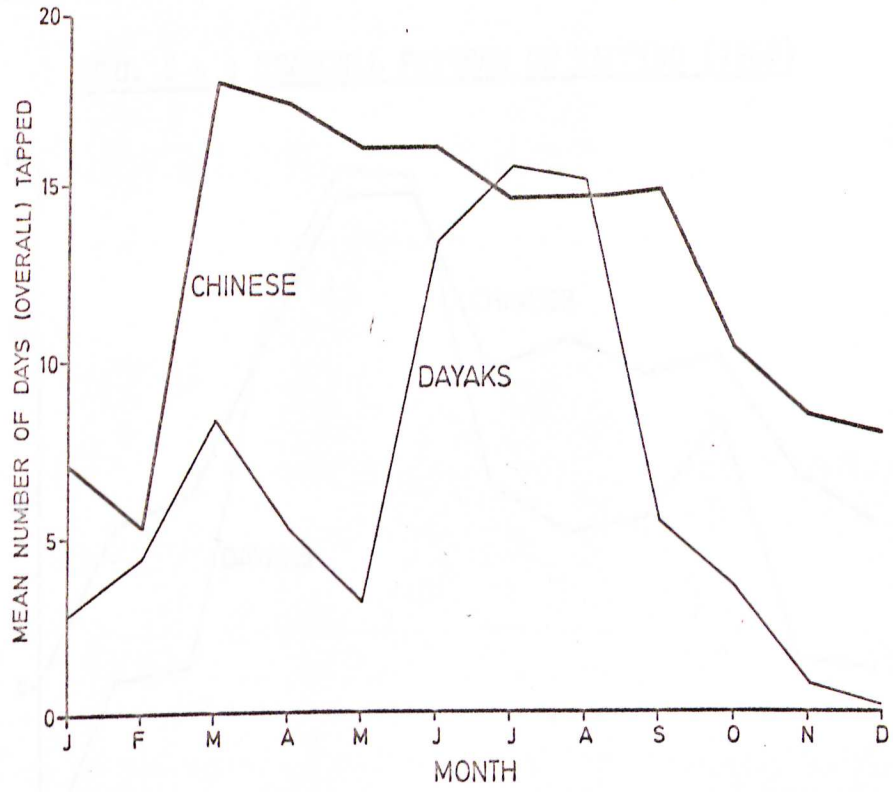


FIG. 5 b : RAINFREE DAYS IN 1967

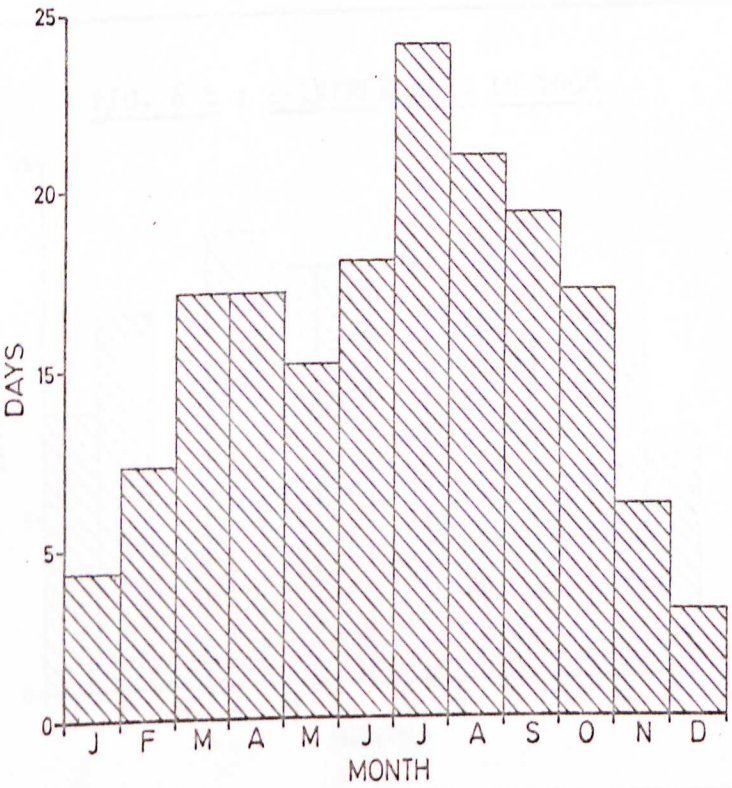


FIG. 6 a : SEASONAL PATTERN OF TAPPING (1968)

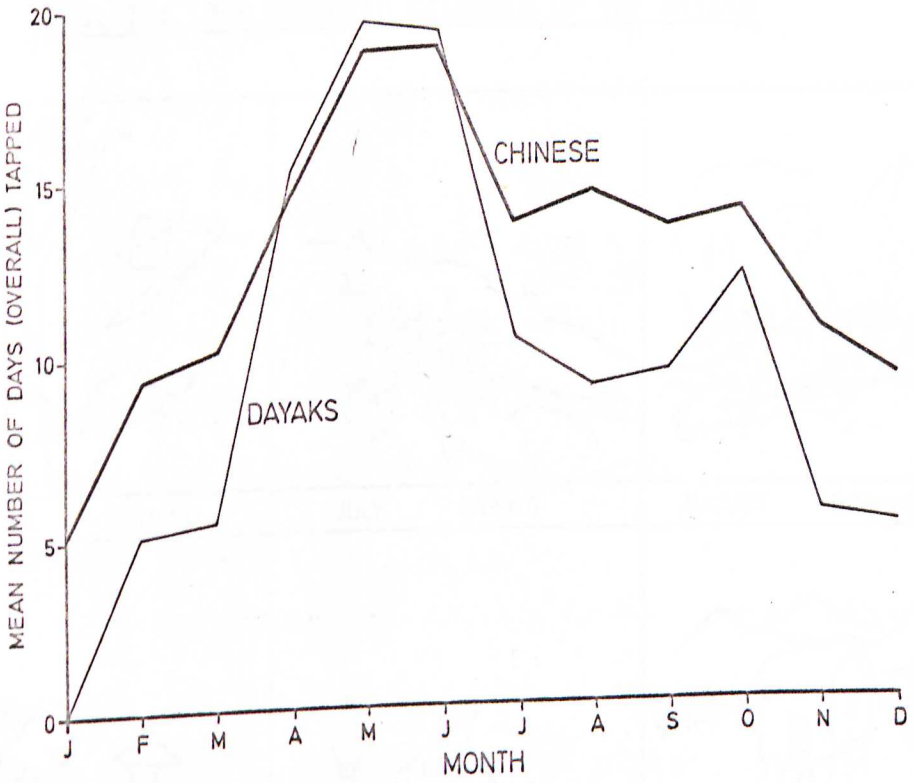


FIG. 6 b : RAINFREE DAYS IN 1968

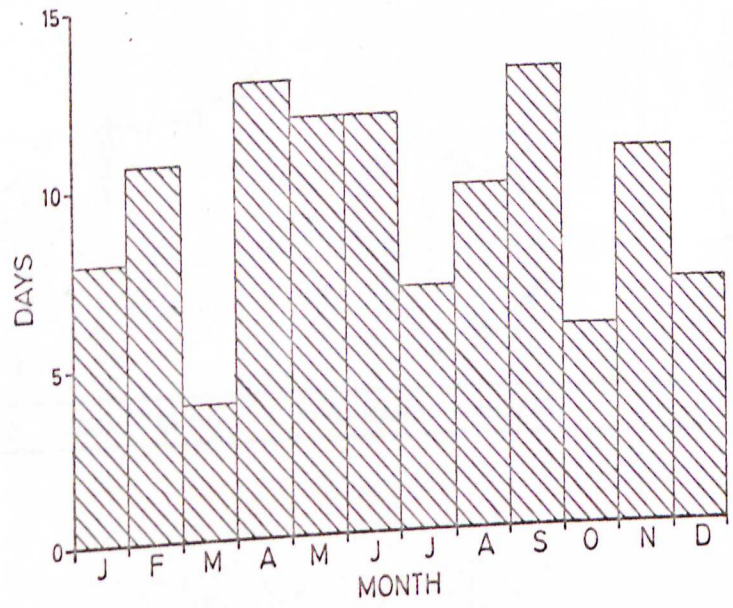
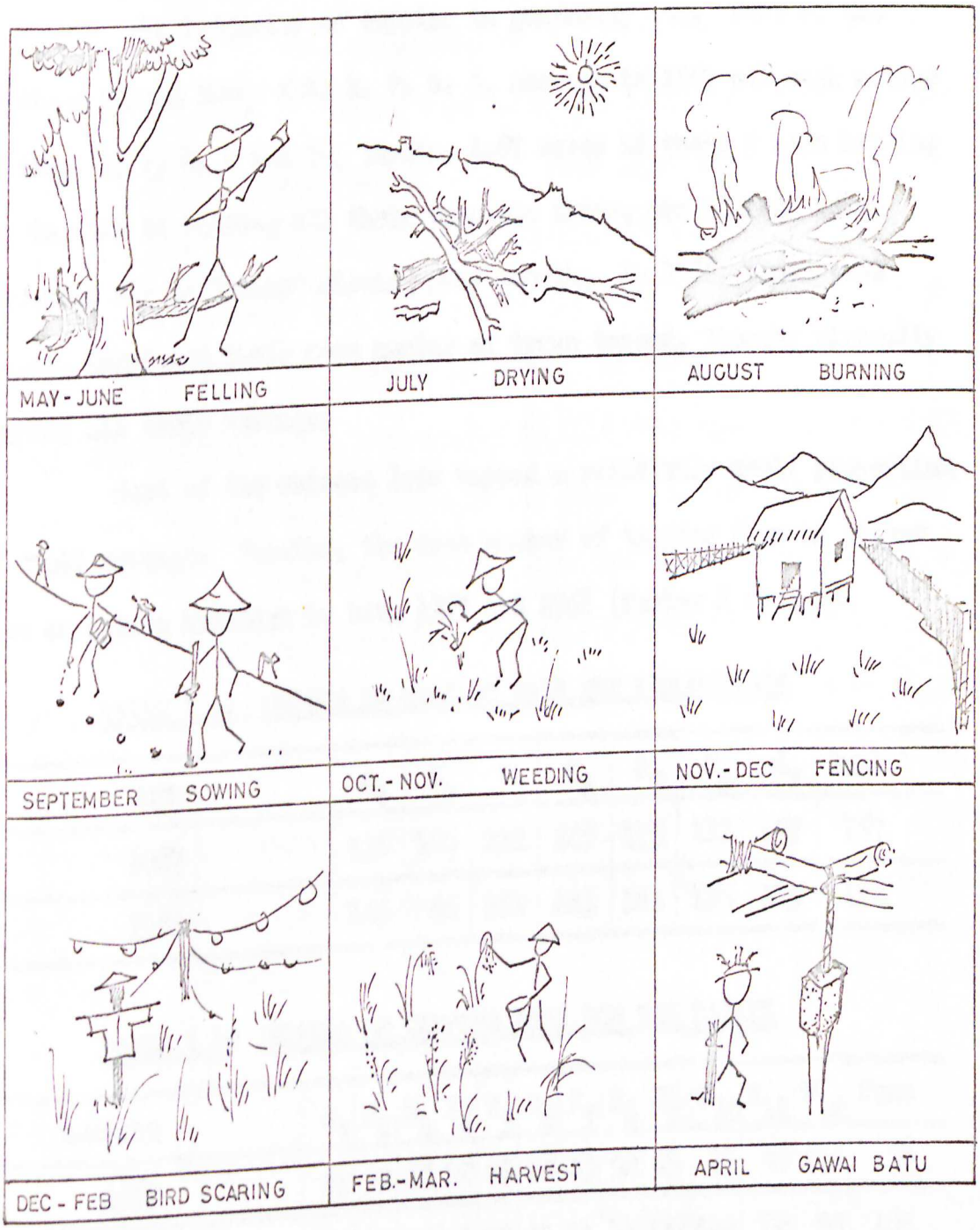


FIG. 7 : THE ECONOMIC CALENDAR OF THE DAYAKS



Especially from September to December when they start sowing padi seeds and weeding, not much tapping is done. During the harvest months of February and March, not much tapping is done either.

(v) Intensity of Tapping

The intensity of tapping is generally low. None of the holdings tapped their full R. P. S. A. acreage in 1967 although native holdings 5, 7, 8, 9 and 10, tapping 1.67 acres of their 2 acre holding may in fact be tapping all their tappable trees, the balance being accounted for by "runts" showing poor growth. In 1968, these same farmers increased their mean number of trees tapped, thereby virtually tapping all their acreage.

Most of the Chinese lots tapped a relatively small proportion of their acreage. However, the mean number of tapping days is higher than on native holdings in both 1967 and 1968 (Tables 1 a; 1 b).

TABLE 1 a: NUMBER OF TAPPING DAYS FOR THE CHINESE

Lot	C_1	C_2	C_3	C_4	C_5	C_6	C_7	Mean
1967	136	108	212	249	175	183	109	167
1968	166	88	181	243	163	195	185	174

TABLE 1 b: NUMBER OF TAPPING DAYS FOR THE DAYAKS

Holding	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	Mean
1967	69	92	86	29	83	86	69	92	65	63	99	121	79
1968	101	102	106	96	132	93	121	83	137	120	84	95	106

The student t test shows that the difference is significant at 95% probability level but not at 99.9% for 17 degrees of freedom. But 99.9% is a very high level therefore it can be said that the number of tapping days for the Chinese is significantly higher than those of the Dayaks. Given the local practice of abandoning tapping completely on rainy days, C_4 can be said to be tapping the maximum number of days possible.

The number of tapping days on Native holdings increased between 1967 and 1968 (Table 1b). The student t test shows that there is a significant increase at the 95% probability level but not at 99% for 22 degrees of freedom. This significant increase is not the result of any increase in price as commonly believed. In fact, the prices of rubber declines during the padi months in 1968 over 1967. In June 1967, the average price of rubber is $57.25 per picul and steadily increases to $61.50 cents per picul in December. But for the same months in 1968, the prices of rubber decreases from $55.63 per picul to $45.00 per picul (Department of Agriculture, Kuching 1967; 1968). The increase in tapping is most probably a result of a poor harvest in padi in 1968 as indicated by the increased tapping in April, May and June after the harvest. The intensity of tapping during these months in 1968 shows a relative increase over that in 1967 (Figs. 5 a; 6 a).

(vi) Yield

The student t test shows that there is a very significant difference between the yields per acre in 1968 between the Chinese lots and Dayak holdings (Table 2) the former shows a greater yield per acre over the later at 99% probability level but not at the 99.8%

TABLE 2 : ANNUAL YIELD PER ACRE (lbs. d.r.c.), 1968

	Chinese	Dayaks
	489.9	656.0
	602.8	921.7
	907.6	802.0
	1089.2	593.7
	1263.9	847.5
	1270.8	620.0
	819.2	965.8
		478.8
		1015.1
		790.0
		816.5
		632.0
Mean	920.0	762.8

level for 17 degrees of freedom. This is to be expected as the Chinese tap more frequently than the Dayaks as their means of livelihood depends on their rubber gardens. Moreover, their trees which are planted in 1956/57 under the Rubber Replanting Scheme A, are more healthy looking and bigger in size than those in the Dayak holdings. Thus a one-third spiral cut on a tree in a Chinese garden would be longer and thereby produce considerably more latex than one in a Dayak garden. An interesting point is that both the Dayaks and Chinese have expressed their regrets that some of their high yielding clones from the government are not producing as much as expected. In fact they pointed out that the

yield of some "high yielding" clones are not much different from ordinary rubber trees. This may probably be due to the practice of estates in West Malaysia, of sending out small boys with kerosene tins to collect the seeds. These boys may have collected some big seeds from a neighbouring holding which is not planted with high yielding rubber trees. Therefore in reality, the so-called "high yielding" rubber seeds are just ordinary seeds.

(vii) Labor Imput and Productivity

Although the Chinese holdings show a greater intensity of labor imput than the Dayaks (Table 3), the difference is not very

TABLE 3 : DAILY WORKHOURS PER ACRE

Chinese	Dayaks
3.29	2.12
2.07	4.89
3.28	3.86
2.73	2.70
3.61	2.12
2.71	2.51
3.46	2.39
	2.20
	2.27
	2.01
	3.78
	2.30
Mean 3.02	2.76

significant. The student t test shows that the difference is only significant at 75% and not at 90% probability level for 17 degrees of freedom. It is important to note that the above workhours do not include the time taken to walk from the house to the garden which in the case of the Dayaks takes 15 to 20 minutes daily whereas for the Chinese it is a matter of a few seconds.

The Dayaks however, show higher output per work hour over the Chinese (Table 4). The student t test shows that the difference is still very significant at 99.9% probability level for 17^{0} of freedom. This may either be due to an error in measurement or is the direct result

TABLE 4 : OUTPUT PER WORKHOUR (lbs)

Chinese	Dayaks
0.89	3.06
3.32	1.85
1.53	1.96
1.64	2.29
2.16	3.03
2.40	2.65
1.28	3.36
	2.63
	3.28
	3.28
	2.57
	2.89
Mean 1.89	2.74

of the different pattern of tapping practised by these 2 communities. Though the former cannot be ruled out, the second is more valid.

The seasonal tapping pattern of the Chinese does not vary as much as that of the Dayaks (Figs. 5 a ; 6 a). Thus though they may be capable of tapping more than twice as many trees (500 trees per Chinese worker per day against only 200 trees per Dayak tapper per day), this would be offset by the poor results - less return per workhour. The greater frequency of tapping by the Chinese can be explained by their sole dependence on rubber as their main source of livelihood. Thus even in the landas months (Figs. 5 a ; 6 a), tapping is done, though not as frequently as the drier months, completely abandoning tapping only when forced to because it rains all day. If it rains only in the morning but stops in the late morning, the Chinese tappers will still proceed to tap their trees by which time, the yield per tree and consequently the yield per work hour will considerably decline. Because the turgor of the trunk is much reduced as the day temperature rises owing to loss of water by transpiration, the yield of rubber trees falls off rapidly from dawn until later in the morning. The average difference in yield ... is about 16% between tapping made at 6 a.m. and at 10 a.m. (Edgar, 1958, p. 325).

In addition to this, a further loss of crop will result as a result of overnight or morning rains. This is because tapping panels will still be wet and rainwater will still be dripping from sprouts thereby washing away some of the latex.

The Chinese also tap more frequently than the Dayaks during the wintering and leaf renewal months which in Sarawak occurs in July and August. (Fig. 6 a). This will not only be a drain on the trees

but the yield is reduced too during the period of wintering and especially during the period of leaf renewal. Experiments show that during the period of leaf fall or when trees are leafless, starch reserves, the chief form in which surplus food material is stored by the tree until required, remain more or less normal, but that during the period when refoliation was at its maximum, nearly all the starch reserves have been used up (Edgar, 1958, p. 339).

Another factor is that the Land Dayaks tap nearer to the base of the tree. This is partly the direct result of the shorter stature of the Land Dayaks. Whereas Chinese average from 5 feet 4 inches to 5 feet 6 inches in height for men and 5 feet to 5 feet 2 inches for women; Land Dayaks average from 4 feet 11 inches to 5 feet 4 inches for men and 4 feet 8 inches to 5 feet for women (Elam, 1937, p. 374). This kind of tapping will give higher yield per tree". Best yields are obtained by tapping at the lowest level consistent with adequate bark renewal. The rate of increase in yield as the tapping cut approaches the base of seedling trees is about 15% per foot from a height of 4 feet" (Edgar, 1958, p. 323).

Thus from the above reasons it is not to be doubted that the yield per work hour will definitely be significantly higher for the Dayak than for his Chinese counterpart. But again, it must be borne in mind that work hours here, do not include travel time from house to the garden. But, had it been included, it would still not affect very much, the very significant higher labor returns for the Dayak than for the Chinese smallholder.

Chinese tappers will thus be more economically well off if

they tap less frequently that is, on an alternate daily basis rather than on a daily basis, and devote more time to other cash crops like pepper. The Dayaks, on the other hand, can increase their yield per acre if they increase their tapping frequency.

CHAPTER VI

PROCESSING

(i) Equipment.

This consists mainly of buckets, tanks, coagulating pans which may be made by cutting kerosene tins lengthwise into halves and a pair of mangles. An essential requirement in processing is cleanliness in all the equipment used.

(ii) Processing

In all the rubber gardens under the survey, each has a processing shed in which the coagulating of the latex is performed. The latex is processed individually by smallholders, using privately-owned equipment. Processing among smallholders is an ideal family concern. An operator with the help of the other members of the family can cope up with the work without any difficulty. At the moment, only the final product in the form of sheet rubber is known to the smallholders, the manufacture of which is technically simple and demands no special knowledge.

(iii) Processing Shed

In most cases, the processing sheds of the Chinese are situated near the vicinity of the house whereas those of the Dayaks are located in the gardens. This is mainly because the Chinese place of residence is often situated at the centre of the garden and this

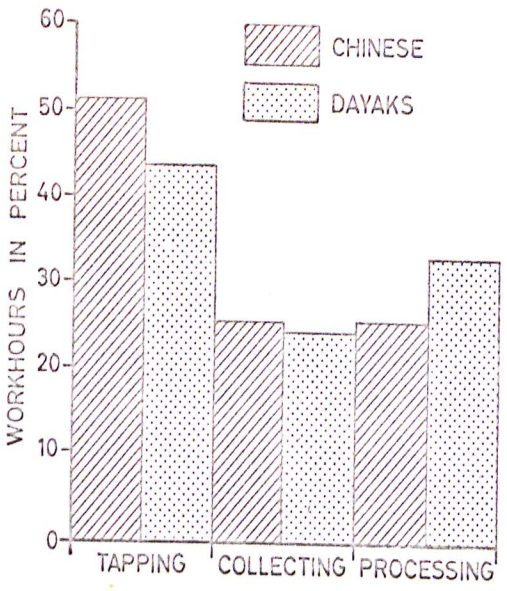
strategic location is vital for a processing shed because it also acts as the centre of the latex collected.

For the Dayaks however, his rubber garden is located at an average distance of about 2 miles away from his house. A processing shed so far away from the garden would entail the unequal hardening of the latex in the buckets and in the process of transferring the collected latex from the garden to the shed 2 miles away would result in the spilling of some of them on the way. To correct all these, the sheds are thus built in the garden.

Iv) Labour Input

A division of labor imput by operation is attempted and it is found that for the Chinese, only 24.4% of the total work hours is devoted to processing while that of the Dayaks amounted to 32.1% (Fig. 8). The shorter work hours alloted to processing among the Chinese may be explained by their use of Calcium carbonate (lime) in addition to formic acid. Selangor Chinese smallholders are also known to have used lime (Voon Phin Kheong, 1967, p. 143), which acts as a catayist and accelerates chemical reaction resulting in coagulation in a matter of half an hour. This is a damaging practice because to produce good rubber, the process of coagulation should continue for a few hours. But although the smallholder gets a lower price for his sheets in the market, the price differential between the best and average grades is insignificant. The smallholders thus do not have the incentive to produce the best quality rubber, for to most of them the time factor is valuable.

FIG. 8 : LABOUR IMPUT BY OPERATION



(v) Smoke house

The smokehouse of a smallholder is usually a simple wooden structure, often built at one end of the processing shed (Plate III). Smoke is sent into the smokehouse through a tunnel built at the side (Plate III).

It is found that none of the Dayak smallholders in the survey have smokehouses and only a few of the Chinese smallholders have them. This is because smoking is a labor intensive operation which involves the handling of rubber sheets, the tending of fire and the collecting of fire wood. The Dayaks give priority to padi, their staple food, and their policy is only to reap what benefits they could from their rubber

PLATE III : SIDE VIEW OF A SMOKEHOUSE

Taken - 4. 3. 70.

holdings in the time left to them.

An advantage of smoking of the rubber sheets is that it enables accurate grading and mitigates faulty assessment of the moisture content by the dealers. But although tappers are familiar with the operation, in the case of the Chinese, it is usually the need to increase income, often necessitated by a large family size which also supplies abundant labour that a smokehouse is established.

CHAPTER VII

MARKETING

(i) Destination

Rubber producers sell their rubber in the form of sheet rubber usually to the local dealers closest to them. This is in order to reduce transport cost, a great problem especially to the Dayaks. The Dayak rubber smallholders of Kampong Giam for example, are on average 12 miles away from the nearest bazaar and transport cost is $1/= per picul of rubber sheet. But Chinese smallholders are close to the town area being on an average of 2 miles away from it. Smallholders in the tenth mile area bring their sheet rubber on their bicycles to the local dealers in the tenth mile bazaar. Others in Sungei Tapang too, do not have to pay for the transport of the sheet rubber to the bazaar. This is because the competition among local rubber dealers are very keen in the Batu Kitang area and hence local dealers come in their barges to collect the sheet rubber without charging for the transport fee.

(ii) Structure

These local dealers serve as the first rung of buyers in the chain of middleman buyers prevailing in the marketing of this commodity. They undertake initial assembly, grading, storing and the transport of rubber and in turn sell to the next buyers. Rubber dealing is often managed with a provision shop. And it is quite common for

rubber smallholders to bring their rubber to the shopkeeper in exchange for the goods that he sells. This is particularly so if the smallholders are given credit earlier on by the shopkeeper. Rubber dealing is monopolised by the Chinese.

(iii) Services

Among the services rendered are the weighing and grading of the sheet rubber. Most smallholders and especially the Dayaks, do not know how to operate the Chinese Steelyard, an instrument used by the Chinese for weighing. It is an undeniable fact that the dealers always round up the weight to the nearest half kati downwards as the weighted. These dealers are in a better position to bargain and customers have to comply with whatever is said by the dealer knowing that it is futile to protest.

The same goes for assessing the qualitative nature of the smoked sheets which is often based on visual appearance and subjective judgement. In addition to the fact that this subjective nature of assessment would be to the disadvantage of smallholders, it is also unscientific as the emphasis is not laid on the dirt content, processing and vulcanizing characteristics of the rubber but on the presence of bubbles and mould growth and the shades of colour.

In the case of unsmoked sheets, the moisture content of the rubber needs to be deducted. This is done purely by guesswork and a measure of experience. Again this is to the disadvantage of the smallholders as the dealers naturally protects his own interest by allowing for a wide margin of error.

But generally however, the dealers do not take too great an advantage over their superior bargaining power, knowing that he would eventually lose his customers if he achieves such a reputation. Tom Harrison commented that Chinese traders enjoy a merited reputation for fair dealing even with illiterate customers who accept their accounts though unable to check them (Harrison, 1958, p. 384).

CHAPTER VIII

CONCLUSION

Chinese rubber smallholders being more dependent on rubber for their means of livelihood and their source of income have larger acreages of rubber than their Dayak counterparts. They practise a greater frequency and consistency in tapping which directly results in a greater annual yield per acre but lesser productivity per work hour when compared to the Dayak smallholders. This difference between the 2 communities on their pattern of work and their dependence on rubber is largely the result of the difference on their values, cultures and the degree of contact with the money economy. "The Chinese who work by a cash economy and the Land Dayaks who care most for self subsistence"(Harrison, 1959, p. 131).

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